

COLONY OF MAURITIUS

ANNUAL REPORT

ON THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1921



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No. 1/22.

THE HONOURABLE THE COLONIAL SECRETARY,

I have the honour to submit the report on the Department of Agriculture and on Agricultural conditions in the Colony for the year 1921.

PART I

AGRICULTURAL CONDITIONS IN 1921

The weather conditions experienced during the growing season are summarised in the annexed tabular statement.

Month and Year		Temperature	Rainfall
1920			
November	...	Markedly below normal	... Considerably below normal
December	...	„ below normal	... Considerably below normal
1921			
January	...	Below normal	... Normal
February	...	Below „	... Considerably below normal
March	...	Below „	... Below normal
April	...	Considerably below normal	... Considerably below normal
May	...	Considerably below normal	... Above normal
June	...	Below normal	... Considerably below normal
July	...	Normal	... Considerably below normal
August	...	Slightly below normal	... Normal
September	...	Normal	... Above normal
October	...	Above normal	... Markedly above normal
November	...	Above „	... Considerably above normal
December	...	Above „	... Normal

The weather conditions were thus generally most unfavourable ; deficiency of temperature and drought prevailing during the growing season, with high temperature and heavy rainfall during the harvesting season. On March 11th, a cyclone passed within hundred miles North of Mauritius, causing appreciable damage to the plantations. The harm done (estimated at about 9% of the standing crop) was aggravated by low temperature and defective rainfall afterwards, while the abnormal and unseasonable rainfall of September, October and November caused great reduction in the sucrose content of standing canes and hence, in the extraction of sugar.

The final estimate for the crop of 1921-22 is 206, 150 metric tons, which is about 20% below normal.

In Pamplemousses and Rivière du Rempart, the returns were better than anywhere else and the reduction was about 10 o/o on the normal. In Flacq, Grand Port and Savanne, the reduction reached 20% while Plaines Wilhems, Moka and Black River evinced a reduction of between 25 and 30%.

SUGAR INDUSTRY.

The following figures give the final estimate of the 1921-22 crop, compared with the total output of the seven preceding years.

1921-22 Sugar Crop-Final Estimate-in 000 Tons Metric.

District	1921 Final Estimate	1920	1919	1918	1917	1916	1915	1914
Pamplemousses and Rivière du Rempart	50.68	59.16	50.63	64.22	49.4	45.92	39.54	66.06
Flacq ...	35.32	45.35	36.86	43.69	39.7	35.04	37.94	43.73
Moka ...	29.22	37.58	35.24	34.70	31.7	31.38	34.91	42.09
Plaines Wilhems ...	14.53	21.36	19.38	19.34	17.9	15.74	13.45	21.16
Black River ...	6.00	7.57	6.54	6.25	6.5	6.08	5.13	6.60
Savanne ...	33.95	41.55	43.33	40.81	38.5	36.19	40.65	46.71
Grand Port ...	36.45	47.30	43.21	43.76	42.3	38.62	42.91	51.01
Total ...	206.15	259.87	235.19	252.77	226.0	208.97	214.53	277.36

Yield of Vesou Sugar.—Of the estimated crop of 206,150 tons, for 1921-22 approximately 95.8% will, it is anticipated, consist of vesou sugar; only 0.3% of first syrups and 3.9% of low syrups will probably be manufactured. The table given below shows the proportion of vesou sugar to the total crop for the past 10 years. The high proportion of vesou sugar (i.e. 1st grade plantation white) continues to be a feature of the sugar manufacture of the Colony.

Year	% Vesou to total crop	Year	% Vesou to total crop
1912 ...	78.70	1917 ...	89.85
1913 ...	80.06	1918 ...	94.50
1914 ...	82.01	1919 ...	94.45
1915 ...	82.60	1920 ...	95.46
1916 ...	80.23	1921 ...	95.80 (Estimated.)

Factory work of 1921-22.—The average extraction of sugar for the crop is estimated to be 10.2% of the weight of cane handled, the lowest recorded since 1909. This is due to very unfavourable weather conditions which prevailed throughout the greater part of the grinding season. Results for previous years are appended:—

Year	Commercial Sugar extracted % Cane	Year	Commercial Sugar extracted % Cane
1914 ...	10.76	1918 ...	10.95
1915 ...	10.83	1919 ...	10.42
1916 ...	10.30	1920 ...	10.76
1917 ...	10.62	1921 ...	10.20 (Estimated.)

Factory work of 1920-21.—The total tonnage of cane crushed for the crop of 1920 amounted to 2,414, 336, giving a mean extraction of commercial sugar of 10.76 per cent. of cane. The corresponding figure in 1919 was 10.42. The highest mean extraction for any single usine during 1920 was 11.64% and the lowest, 9.55. The frequency distribution of extractions in 1920, as compared with 1919, was as follows:—

Extraction.	Frequency 1919-1920	Extraction.	Frequency 1919-1920
8.50—8.74	1 0	10.25—10.49	12 3
8.75—8.99	1 0	10.50—10.74	13 13
9.00—9.24	0 0	10.75—10.99	5 9
9.25—9.49	0 0	11.00—11.24	8 11
9.50—9.74	2 2	11.25—11.49	0 3
9.75—9.99	5 3	11.50—11.74	0 4
10.00—10.24	6 6	11.75—12.00	1 0

The higher standard of work done in 1920 is evidenced by the markedly greater number of usines with high extractions.

Factories conditions in 1921.—During the year 1921, 54 factories operated; there has been no alteration in the number of factories at work in the Colony since 1918.

Very considerable improvements have been introduced into a number of factories during the past year. The value of machinery imported during the year 1920 approximated to 2½ million rupees; the corresponding figure for 1921 is over 5½ million rupees

Among other items, the following new machinery was installed in 1920 :—1 mill, 7 economizers, 6 derricks, 8 crushers, 30 messchaert cylinders, 15 defecators, 10 decantors, 6 quadruple effects, 30 crystallisers, 30 Weston centrifugals, 8 cane carriers, 6 sulphitation apparatus, 6 filter presses, 5 juice heaters, 6 vacuum pans, 1 barometric condenser and 3 boilers.

During the year 1921, local firms have installed among other items, the following machinery:— 6 cane carriers, 2 mills, 3 sulphitation apparatus, 6 defecators, 2 filter presses, 3 air compressors, 4 quadruple effects, 6 vacuum pans, 2 air pumps, 7 juice and magma pumps, 5 pans, 51 crystallisers, 7 boilers, 3 hydraulic attachments for mills, etc, etc.

The value of imported material for mechanical transport on Sugar Estates was about 1½ million rupees in 1920 and about 1 million in 1921.

EFFECT OF LABOUR SHORTAGE ON AGRICULTURAL OPERATIONS.

Sugar manufacturing operations were again conducted under considerable difficulties during the year, owing mainly to labour shortage. Great difficulties were experienced in the reaping of the crop and also in the performance of cultural operations.

As the result of the unprecedented prices paid for canes last year, a large number of small planters who, as a rule, worked as day labourers, found themselves in a position to dictate their terms to employers. These men, being no longer under the pressure of necessity, hired themselves out with considerable reluctance and at very high prices, thereby causing a dearth of hands and a greatly enhanced rate of wages.

The following table gives an idea of wages currently paid to day labourers and the cost of agricultural operations during the year.

Day labourers	...	...	Rs. 2.00—Rs. 3.00
Female labourers	...	...	1.00— 1.50
Clearing land	...	...	150.00— 400.00—per arpent
"Fosseyage"	...	...	50.00— 100.00 "
Manuring	...	...	10.00— 20.00 "
Weeding	...	...	50.00— 80.00 "
Cutting canes	...	...	25.00— 50.00 "

The result is seen everywhere in a marked lowering of the standard of cultivation adopted.

Mechanical Cultivation.—In consequence of this state of affairs, considerably increased attention has been devoted to the adoption of labour saving devices in relation to cultivation. During the year, 8 tractors of 5 different marks were imported into the Colony, while public demonstrations of the work of two tractors were given by Estate owners or importers, viz.: the Cletrac, and the Somua. The Cletrac cultivator has shown itself, so far, to be well adapted to certain classes of agricultural operations and a number have already been imported for use. The question has been further dealt with by a Joint Committee of the Board of Agriculture and of the Chamber of Agriculture under the Chairmanship of the Director of Agriculture. Under the auspices of the Committee, detailed information respecting the Agricultural operations required to be performed in cane cultivation was collected and forwarded to the tractor experts of the English Ministry of Agriculture. A full report was subsequently received from the Ministry, in which were given details of tractors likely to prove useful in Mauritius, together with a list of ploughs and implements which appeared suitable. Of the tractors recommended, two have already been imported through private agencies, and the Government and the Chamber of Agriculture, acting in co-operation subsequently made arrangements to import examples of the other tractors recommended by the Ministry, which had not already been introduced. Concurrently, a scheme for public tractor trials was devised, whereby opportunities will be given to all tractors existing in the Island to demonstrate their capacity. It is anticipated that these trials will take place in April 1922.

Concurrently, a considerable increase has taken place in the use of ploughs and cultivators for implemental tillage and, altogether, ploughs and accessories to the value of Rs. 83,433 have been introduced during the year.

In relation to cultivators, the difficulty has always been experienced of obtaining a sufficiently strongly built machine to withstand the wear and tear incident on work on the very stony soils characteristic of many localities of this country. Up to the present, probably the most successful cultivator has been one of simple design, manufactured in the Colony and locally known as the Daniel Cultivator.

With the very considerable field for the introduction of implements, which undoubtedly exists in the Colony, there should be openings for manufacturers who can produce a type of cultivator suited to these conditions.

Area under cultivation.—At the end of 1920, the total area under sugar cane was estimated to be 171,845 arpents (179,240 acres,) or 39.1% of the total area of the Colony, this is the highest on record. The increase in 1921 is small as compared with the increase in 1920 and it is estimated that the total area at the end of 1921 will be about 172,000 arpents. More exact figures are not yet available.

AREA CULTIVATED BY INDIAN PROPRIETORS.

At the end of 1920, the area cultivated by Indians was estimated to be 77,250 arpents (80,200 acres) or nearly 45% of the total cane cultivation. In 1921, an appreciable increase took place, but exact figures are not yet available. It has always been a difficult matter to estimate exactly the area cultivated by Indian proprietors owing to the multiplicity of small plots which are scattered practically all over the Island and the fact that no system of land registration is in force.

With the co-operation of the Census Commissioner, the attempt was made during the population census of 1921 to carry out an agricultural enumeration of the area cultivated. The completed figures for this enumeration are not yet available but it is hoped that, as the result of the action taken, it will be possible, for the first time, to obtain an approximately exact figure for the total area cultivated by Indians on small holdings.

The large profits made by Indians on last year's sales of canes have been, to a considerable degree, invested in the purchase of new lands. Such purchases have however, been made in many cases, at excessively large values, in anticipation of another year or very high prices for sugar and it is to be feared that in some cases unfortunate results may ensue with the return of prices to a more normal level.

Irrigation of Sugar Cane.—The La Ferme Irrigation Scheme for the district of Black River is practically completed and the total area planted in canes dependent on the reservoir exceeds 3,000 arpents, shewing an increase of about 400 arpents over last year. Owing to the intense drought which prevailed during the year, the distribution of water to planters was stopped early in August and was only resumed in October.

The proposal for the establishment of an Experiment Station for the investigation of problems connected with the irrigation of sugar cane, took definite shape during the year.

This question has been under consideration for some considerable time. The necessity for its establishment had been shewn by investigations into the rates of applications of water and the corresponding return of canes obtained in irrigated tracts.

It appears that, in individual cases, more than 100% variation occurred between the amount of water applied by different planters per acre and that no sort of correlation could be established between the amount of water used and the corresponding cane returns. There appeared reason to believe that, in many cases, excessive amount of water, were being applied and the gross return of cane from the irrigated area as compared with the total expenditure of water, fell considerably short of what was to be expected from a comparison with the results obtained in other countries.

In some cases also, the methods employed for applying water involved a waste owing to the unduly long traverses which water was required to make before reaching the plants to be irrigated.

Consequently, the establishment of an Experiment Station was advocated with a view to investigating the most economical methods of applying water and the optimum frequency and depth of watering. Conjoined with this, were questions in relation to cultivation, manuring and choice of cane varieties under irrigated conditions.

In February 1921, the Council of Government, on the basis of a report by a Committee of the Board of Agriculture, sanctioned the appropriation of Rs. 30,000 for the creation of such an experimental Station and an arrangement was entered into with the Medine Sugar Estate Company Limited, whereby about 30 arpents of land were handed over to Government, free of rent, for a period of 5 years, for the purpose of establishing it.

The work of laying out the Station was commenced in April, and at the end of the year, was practically completed, the first canes being planted in the month of December.

It is hoped that the work of this station will throw light on many problems which are as yet obscure and will tend to increase the efficiency of irrigation practised in the Colony.

During the year, substantial progress was made with the irrigation scheme for the north of the island, locally known as the "La Nicolière" Scheme. This project is of considerably greater magnitude than the "La Ferme" installation and aims eventually at supplying water to some 10,000 arpents of cultivated land in the northern and north western districts. The complete scheme comprises three storage reservoirs:—one at La Nicolière, one in the vicinity of Midlands and one at Calebasses with appropriate feeders and distributories.

During 1921, the construction of the reservoirs at La Nicolière was pushed on. The scheme is financed by means of a series of public loans. A first loan of Rs. 500,000 was raised under Ordinances No. 8 of 1919 and No. 6 of 1920 and a further loan of Rs. 500,000 was authorised by Ordinance No. 24 of 1921.

Disposal of the Sugar Crop.—The Sugar Planters' Syndicate, constituted under Ordinance No. 10 of 1919, was reconstituted this year under Ordinance No. 7 of 1921, practically all planters adhering thereto.

The mean price per 50 kilos of last year's sugar output, sold to the Royal Commission, is not yet available but approximates to Rs. 50.50; the gross value of the 1920 crop is estimated to have been approximately Rs. 250,000,000. The Royal Commission having ceased operations, the Syndicate is disposing of the local sugars to private buyers. At the present, the market has been uncertain and sales have ranged between Rs. 11 and Rs. 12 per 50 kilos on the average.

Cost of Production.—The cost of production of sugar rose steadily since 1914 and reached its highest value in 1921. While last year immense profits were made on the sales of sugar, this year, the return to nearly normal prices, associated with a maximum cost of production, will cause a large proportion of the usines of this Colony to close the sugar campaign with a deficit.

In relation to the sugar crop of 1920, records would be incomplete if allusion was not made to the special tax levied on the crop of that year for the purpose of constituting a special fund to be devoted to public development and improvement in the Colony, which was authorised under Ordinance No. 36 of 1920, whereby a special export tax of Rs. 40 per ton was levied on all sugars leaving the Colony during the period. This tax has yielded at the present time a total of Rs. 14,074,220. It is the intention to devote this fund to the carrying out of various developments and improvements, notably works of a sanitary character while an expenditure of Rs. 100,000 for the erection of an Agricultural College and Rs. 100,000 for a Model Dairy have also been sanctioned. Expenditure from the fund is controlled by Government with the advice and assistance of an Advisory Board appointed under the terms of the above ordinance.

Pests and diseases of the Sugar Cane during 1921.—In relation to the *Phytalus Smithi* Campaign, operations for the control of the pest were greatly extended through the action of planters, whereby a special export tax of R.0.20 per ton of exported sugar was levied for the purpose of providing funds therefor.

For the year 1920, the yield of the tax was estimated to be Rs. 49,000 and this sum was accordingly placed on the estimates for expenditure in this connection. In consequence, the plan of campaign was considerably extended, the principal feature consisting in the augmentation of the number of special patrol gangs to a total of 40.

Patrol gangs were divided into two classes:—(A) Peripheral patrol gangs, which were specially designed to counteract the tendency of the pest to spread outwards and (B) patrol gangs for operation at lightly infected centres within the infected area. Combined with this, the system of purchase of beetles collected by the public, which had been inaugurated since the commencement of the campaign was maintained.

The following figures give the number of insects captured in each year since the commencement of the campaign:—

Year.	Beetles captured.	Year.	Beetles captured.
1911-12 ...	26,460,187	1916-17 ...	72,292,689
1912-13 ...	16,055,556	1917-18 ...	70,035,663
1913-14 ...	36,484,130	1918-19 ...	71,119,278
1914-15 ...	51,356,507	1919-20 ...	30,969,504
1915-16 ...	42,511,241	1920-21 ...	23,269,513

The further reduction in the number of insects captured during the period under review, points to a further considerable diminution in the incidence of the pest. This point is clearly shewn when detailed returns from different properties are examined. At the present time, numerous estates which were formerly heavily infected are now practically free from this insect and the majority of the insects captured are derived from the newer centres of infection. The success which has attended so far these methods of repression must be regarded as most satisfactory.

The small independent infection with *Phytalus Smithi* detected at Joli Bois in 1919 has continued to be dealt with in conjunction with the main campaign. During the year, 1,370,441 insects were captured there.

The beneficial effects of the parasitic wasp *Tiphia paralella* imported in 1915 as an enemy of *Phytalus Smithi* was again markedly in evidence in the Pamplemousses area. The insect has also been introduced and has become established at Joli Bois.

An important observation was recorded by the Assistant Director of Agriculture Director who established that the parasitic wasp (*Elis thoracica*) introduced by him in Mauritius in 1917 from Madagascar was exercising an extensive control on *Phytalus Smithi* in the Pamplemousses area. Nothing is known concerning the natural host of the insect in Madagascar and it was introduced to Mauritius in the hope that the insect would adapt itself as one of the parasites of the melolonthid larvæ here existing; the evidence of its parasitism on *Phytalus Smithi* is an interesting demonstration of its adaptability and is of considerable importance.

No other insect and fungoid pests of the cane have been markedly in evidence. The "Gros Moutouc" (*Oryctes tarandus*) has been considerably reduced in intensity on certain properties in Savanne as the result of methods of repression adopted which have included the digging out of larvæ and the capture of adult beetles. The parasitic enemy of the insect, "*Scolia Oryctophaga*," has not been observed during the year.

During the year, the proprietors of one of the Sugar Estates of Grand Port offered to the Department of Agriculture a sum of Rs. 1,000 to facilitate further importations of this insect, but, owing to the existence of Bubonic plague in Madagascar and in Mauritius, it was not found possible to carry out the proposed importation on account of quarantine restrictions.

In relation to fungoid diseases of the sugar cane, root disease was in evidence at one of the properties in the Pamplemousses area; the attack responded to methods of treatment recommended by the Department of Agriculture.

Other bacterial and fungoid diseases have only been occasionally in evidence. The Mosaic Disease of Sugar Cane which has attracted a great deal of attention in many other cane growing countries has, so far, not been found to exist in Mauritius.

Experimental Investigation in relation to the Sugar Industry in Mauritius.—Experimental Investigations have been continued during the year by the Department of Agriculture. In the field, these have comprised trials with manurial applications to cane and with varieties of canes.

The results of manurial experiments arrived at in former years have been further substantiated and it appears fairly clearly that under cultural conditions in Mauritius, the first requisite for successful cultivation is that the field should be supplied with organic manure in the shape of fumier (pen manure).

Application of molasses also give rise to considerable increases in the yields. The application of artificial manures, in addition to fumier, to virgin canes also occasion further increases in yield in the higher and wetter districts. On the lower lands, such applications to virgin canes are more problematical in their effects; to ratoon canes, they are more beneficial.

The most advantageous artificial manure to employ is nitrogen in a quickly acting form, conveying about 60 lbs of nitrogen to the acre; sulphate of ammonia and nitrate of soda both give satisfactory results but sulphate of ammonia seems rather better suited to Mauritius conditions than nitrate of soda. Potash sometimes leads to profitable increases in yield but its effect is more variable than that of nitrogen while phosphatic manures show still greater variability in their effects. The latter result is unexpected inasmuch as the soils of Mauritius are characteristically deficient in Phosphoric Acid.

During the year, an extensive series of experiments was carried out with nitrate of ammonia, a new synthetic nitrogenous manure produced from atmospheric nitrogen. The experiments, conducted on virgin canes at different points, indicated that this manure gave results, fully equal if not superior to those obtained with sulphate of ammonia.

In relation to the trials with varieties, as the result of the extensive experiments carried out by the Department of Agriculture at its own Experiment Station and at co-operative experiment station on estates, a number of new varieties have been selected as more than ordinarily promising and are specially recommended to planters for trial.

Planting material of these new varieties was placed at the disposal of planters during the year.

In relation to laboratory investigations, an extensive research was carried out and the results published relative to the composition and utilisation of exhausted molasses with special reference to the manufacture of industrial alcohol.

The question of the deterioration of Mauritius Sugar during storage was also made the subject of investigation and the results thereof have been thrown together in the form of a Bulletin for publication.

The results were also communicated to the "Société Royale des Arts et des Sciences" during September. They indicate that the deterioration of Mauritius Sugar during storage which has been increasingly in evidence of late years, is to be attributed to the action of micro organisms, the chief of which appears to be a form of torula. The liability of sugar to deterioration is however closely connected with atmospheric conditions at the point of storage. Vesou sugars, i.e., plantation white, are more hygroscopic than ordinary refining crystals and, in a damp atmosphere, they are liable to absorb sufficient moisture from the air to provide a medium in which the destructive organisms with which the sugars are infected are capable of propagating themselves.

Investigations of a statistical nature have been conducted into the probable errors incident on the field trials conducted by the Department of Agriculture, which threw interesting side lights on the reliability attaching to the various experiments, while, in addition, investigations into the cost of production of sugar have been continued.

Other experimental work in progress has included investigation into the effect on the biological processes of the soil, of application of molasses, a point which is of considerable importance in view of the proved value of dressings of molasses to cane plantations.

Investigations have also been commenced with a view to erecting standards of fertility for different types of Mauritius Soils, with special reference to recent developments in relation to biological functions and soil acidity and as preliminary to the resumption of work on the general soil survey of the Colony, which, owing to a variety of causes, had been temporarily suspended.

SUBSIDIARY AGRICULTURAL INDUSTRIES.

Owing to the extraordinarily favourable market condition for sugar, which prevailed during 1920, very little interest in any form of subsidiary cultivation was evinced during the earlier part of the year, the tendency having been to rush all available areas into cane and to neglect all other form of cultivation.

The collapse of the sugar market has, however, caused some readjustment in the

position and, by the end of the year, interest had revived, to some extent, in the various minor cultivations commonly carried on in the Colony.

Aloe Fibre.—The production of Aloe Fibre has been practically at a standstill. During the greater part of 1921, quotations ranged from Rs. 350 per ton for fine up to Rs. 450 for prime.

Exports of aloe fibre for the past five years have been as follows:—

1916	...	...	...	7,118	bales
1917	...	...	...	5,647	"
1918	...	...	...	1,974	"
1919	...	...	...	10,139	"
1920	...	...	...	3,500	"
1921	...	...	...	1,150	"

Towards the end of the year, the market shewed a sharp recovery; present quotations being in the region of Rs. 600 per ton; concurrently, there has been a very marked drop in freight quotations for aloe fibre and, at the time of writing, there is every sign of a marked revival of interest in this staple.

The system of cultivation followed in Mauritius whereby lands are planted in Mauritius hemp once for all, and given little or no attention, beyond the reaping of the leaves, facilitates the handling of the industry on these lines, since, when conditions are favourable the produce is reaped, and, when they are not favourable, it is not reaped.

Some interest attached to the possibility of the cultivation of sisal and an experiment of some magnitude is being carried out by Government to investigate possibilities in this direction. It is quite clear that in many of the dry districts of Mauritius, sisal will succeed admirably, given a suitable form of cultivation and it has been shewn experimentally that it is possible to recoup some of the expenses of cultivation by growing suitable crops in the interlines during the first two years' growth of the sisal.

It remains to be seen whether the profits to be yielded by the cultivation of sisal will exceed those derived from growing furcroea.

Production of Alcohol.—The production of rum from the waste molasses of the sugar cane industry is a not unimportant subsidiary industry. At present, there are three distilleries operating in the Colony; formerly they were much more numerous. The methods of production, are, in general, capable of considerable improvement.

The total production of alcohol for the past six years, according to Treasury Returns, is as follows:—

1920-21	...	1,900,000	litres	1917-18	...	1,602,414	litres
1919-20	...	1,666,000	"	1916-17	...	1,883,607	"
1918-19	...	1,529,315	"	1915-16	...	1,091,485	"

This year's production thus constitutes a record.

A certain proportion (58,000 litres this year) is exported principally to Seychelles and Rodrigues; the greater part however enters into human consumption locally, as rum.

The majority of the molasses produced in the Colony is at present used as a fertiliser. Of late years, increased attention has been devoted to the possibilities of alcohol for power purposes. A number of attempts have previously been made to utilise alcohol and mixtures of alcohol and ether as a substitute for motor spirit, but so far, for various reasons, they have not been attended with a very great amount of success.

During the year, an important development was inaugurated in this direction by one of the largest estates in the north of the Colony where a distillery and etherification plant are in course of erection. The new installation is designed to turn out 5,000 litres of alcohol daily and it is intended that the plant should be exclusively devoted to the production of power alcohol; and it is intended to manufacture a mixture of alcohol and ether similar to the preparation known as "Natalite" and it is hoped that the plant will be at work in the course of 1922.

Vanilla.—This crop is cultivated on a limited scale in the Colony, but has declined of recent years. Quotations in 1921 ranged from Rs. 5 to Rs. 9. per kilo according to quality.

Tobacco.—For some years past, the possibilities contained in the production of tobacco in Mauritius, have been under investigation by the Department of Agriculture. The object in view in these investigations has been the production of a type of tobacco similar to that which is produced in Réunion and which is very largely consumed in the Colony. These experiments have been completely successful and have demonstrated that tobacco, fully equal to the ordinary marks of Bourbon Tobacco, can be grown and manufactured in the Colony.

An experimental tobacco factory has been inaugurated by the Department of Agriculture at Port Louis and is now regularly turning out limited quantities of locally produced tobacco which is placed on the local market and meets with a ready sale.

As indicated in last year's report, about 25 acres of Crown Land were leased to intending small cultivators for the purpose of producing tobacco.

As the result of the success which attended these efforts, it was decided during the year to endeavour to extend the cultivation and a system of permits for the cultivation of tobacco on private lands without payment of tax was inaugurated; the condition being that growers holding such permits are required to sell their tobacco to Government at fixed prices or, in default, to pay the prescribed tax.

By the end of the year, permits for 56½ acres had been licensed in this way and produce from these areas is commencing to be received. Simultaneously, a similar system of purchase was inaugurated in Rodrigues and by the end of the year, some 11 tons of tobacco had been received from that dependency for manipulation.

Prospects for the development of a not unimportant minor industry appear to be decidedly hopeful and, if all goes well, it is anticipated that it will become necessary to install new and improved machinery at the Tobacco Factory to deal with the increased output.

Tea.—Owing to the high cost of labour and the superior attraction of sugar, the tea industry has been declining slowly during the past three years and, in spite of the fact that the industry enjoys production on the local market to the extent of R. 0.30 a lb., local producers do not appear able, in existing circumstances, to compete with the imported article.

The local production for the past 33 years has been as follows :—

1888-97	...	...	...	5,000	kilos
1898-07	...	...	...	32,000	"
1908-10	...	...	...	35,000	"
1911-15	...	...	...	38,000	"
1915-17	...	...	...	30,000	"
1917-19	...	...	...	32,000	"
1919-21	...	...	...	20,000	"

Coconuts.—No extension of any importance occurred in relation to coconut plantation though some little interest continues to be shewn on the question.

Scope exists for limited developments in this crop in parts of the "Pas Géométriques." Coconut growing is the principal industry in the oil islands and their total production of copra for the year 1921 amounted to 463,040 kilos of which 196,040 were exported through Mauritius.

The extension of coconut growing in Rodrigues is receiving consideration.

Food Crops.—At the end of 1920, the area under cultivation in food crops and vegetables was approximately 5,000 arpents as compared with 19,600 in 1919. Little change took place in 1921.

Towards the close of the year, however, in view of the great drop in the price of sugar as compared with the preceding year, many small planters returned to food crop cultivation. It is expected that an appreciable increase over last year's figures will be observed but exact figures are not yet available. In this connection, it might be mentioned that the importation of South African maize is depressing markedly the market for local maize. Such importations amounted to 2,165 tons in 1921.

The Maize Sècherie was again operated during the year and 164 tons of maize were treated; of this 153 tons represented maize purchased from small growers and the remainder, maize dried on behalf of planters and Government Establishments.

The additional accommodation installed in 1920 was operated and found to function satisfactorily.

Live Stock.—Increased interest continued to be manifested in Live Stock questions. Very large importations of animals from Madagascar were made during the year; approximately 13,000 being imported for slaughtering and 4,500 for draught purposes. A considerable number of animals of good strain were also imported by planters for breeding purposes from Australia, United States of America and South Africa. The majority of the animals being of milking strain.

The Stock Farm of the Department of Agriculture continued to make satisfactory progress although no sale took place during the year; there is a considerable number of half bred indian cattle on estates at the present time resulting from the Government initiative in this direction.

Further extensions of the Stock Farm have been sanctioned and it is intended to add thereto animals of the Afrikander and Ayreshire Breeds during the ensuing year.

Efforts were made through the initiative of the Mauritius Stock Breeders' Association to arrange for further importations of Indian Cattle during the year and correspondence was exchanged with the Government of India with this object in view. Unfortunately it was found that the Government of India had prohibited the exportation of Indian Breeds of Cattle and in consequence further importations could not be made, but it should be added that the Government of India on further representations being made, agreed to allow as a special concession the exportation to Mauritius of 2 cows and 2 bulls and 2 cows and 1 bull of the Hissar and Mysore breeds respectively; owing to the prevalence of Rinderpest in India advantage has not as yet been taken of this permission. The effect has been considerably to enhance the value of animals already existing in the Colony.

An important development which took place during the year consisted in the inauguration of a Dairy Farm as the result of private enterprise at Chebel, with the object of providing supplies of milk of guaranteed quality.

Another development of importance lay in the decision taken by the Government to inaugurate a Government Dairy. In the first instance, efforts in this direction are to be

confined to purely experimental lines and arrangements have been made for the importation of 25 cows from South Africa and their housing in temporary buildings on Crown Land at Curepipe.

The selection for the site of the Dairy is due to the initiative of His Excellency the Governor, the object in view being to test these lands of which many hundreds of acres are available, as to their suitability as grazing grounds for cattle.

The Mauritius Stock Breeders' Association founded in 1920 continued operations during the year and is proving of value as a means of uniting those interested in stock questions. The Association has started pedigree records for animals owned by members and has arranged for importation of selected animals to the order of members.

It also, in conjunction with the Government, arranged for the holding of a Stock Show in Port Louis in May 1921 but unfortunately owing to the prevalence of surra, the show had to be postponed.

Animal diseases.—An outbreak of Surra [of some magnitude] occurred during the months of April and May in which a considerable number of animals from practically all parts of the island were affected; the total number of cases as recorded being 63. Active measures of control were undertaken by the Veterinary Division of the Department of Agriculture and, as a result, the outbreak was stamped out by the beginning of July. A few sporadic cases of the disease were again recorded during the month of December.

In relation to the April–May outbreak, suspicion exists that the outbreak may have been attributable to importations of mules which had taken place in the latter part of 1920 and early part of 1921; the belief being entertained that the inoculation of the disease into mules caused the trypanosome responsible for the disease to assume a particularly virulent form.

In consequence, further importations of mules were prohibited except under special permit.

Correspondence relative to the probability of this view was exchanged with the Government of India but it would appear that in India no evidence is available on this point.

It became increasingly clear during the year that the regular practice of dipping cattle conferred a considerable degree of immunity against surra and in no case did outbreaks occur on properties on which dipping was regular and properly carried out.

An outbreak of Piroplasmosis occurred at the Dairy Farm at Chebel in December 1921.

The practice of dipping cattle acquired a further extension during the year and a number of additional tanks were erected. Efforts were also made to proceed with the erection of public dipping tanks but much difficulty was encountered in finding suitable sites.

The Government sanctioned the importation of a stock of Soamin to be used as a reserve supply in the treatment of animals in the event of outbreaks of surra.

Further tests were made with Tuberculin on a number of breeding herds, revealing in two instances an alarmingly high degree of infection. In both cases, measures were taken for the slaughtering of infected animals. It seems clear that while bovine tuberculosis cannot be regarded as widely disseminated throughout the Colony, extensive localised infection exists at certain points, especially among breeding herds.

The attention of breeders has been particularly directed to the importance of endeavouring to eradicate the disease and it is hoped that with the measures that are now being taken, the incidence thereof may be considerably reduced.

CO-OPERATIVE CREDIT SOCIETIES.

The Co-Operative Credit Societies Movement has made steady progress during the year. A considerable number of new shareholders have been admitted and four new Societies registered during the year 1921. On December 31st 1921, 34 Societies were in operation; the total membership on June 30th 1921 amounted to 3,504 while the total working capital standing to their credit on the same date amounted to Rs. 445,792, an increase of Rs. 79,935 compared with the corresponding position of June 30th 1920.

As has been mentioned in previous reports, the plan on which these Societies are worked is modelled on and closely follows that which exists in India. The movement is now firmly established in the Colony and the operations of the Societies themselves leave little to be desired. The present position may be taken as abundant demonstration of the soundness of the recommendations which led to the establishment of the movement in the Colony.

HIGHER INSTRUCTION IN AGRICULTURAL SCIENCE

The question of the extension of facilities for higher agricultural education in the Colony has engaged a considerable amount of attention during the year. As the outcome of the work of the Department of Agriculture in training students, discussion took place as to the desirability of amplifying the work of the School of Agriculture and of providing additional accommodation to enable a larger number of students to be admitted each year.

The discussion was focussed and the position reviewed in a memorandum which was laid before the "Société des Chimistes" by the Director of Agriculture in February and as the outcome of this a joint Committee of the Chamber of Agriculture and the "Société des Chimistes" was nominated to consider the position and to draft proposals for the extension

of agricultural teaching. The Committee recommended the development of the School of Agriculture to form a small Agricultural College, the extension of the Department's buildings to provide necessary accommodation and the strengthening of the staff to cope with increased teaching involved. Conjoined with this was a further proposal for the establishment of two travelling studentships, the holders of which would be selected from the graduates of the College of Agriculture; on the completion of their studentships, Laureates would be bound to serve as assistants in the College of Agriculture for a further period.

In addition, the proposals included the addition of a definite branch of Sugar Technology to the existing Department organisation. These proposals were summarised in a memorandum prepared by the Committee and submitted to the Governor and by him laid before the Council of Government.

As the upshot, it was decided that a sum of Rs. 100,000 should be appropriated from the Development and Improvement Fund to provide the necessary buildings and equipment while the extra cost of maintaining the College should be met by a special export tax of three cents per 50 kilos of sugar exported from the Colony.

The proposal subsequently received the sanction of the Secretary of State for the Colonies and by the end of the year draft plans had been prepared for the new buildings and proposals considered for giving effect to the recommendations.

An Advisory Board will be appointed by the Governor, comprising representatives nominated by the Chamber of Agriculture, the "Société des Chimistes," and members appointed from the Board of Agriculture, which will advise on matters concerning the management of the institution.

In other directions, the extension of agricultural teaching has received attention. Lectures to elementary school teachers were definitely taken over by the Department of Agriculture in September 1921 and arrangements made for the regular delivery of courses of lectures on Agricultural Science to such teachers as part of departmental routine.

Arrangements were also made for courses of lectures to be delivered to employes of sugar estates on matters of agricultural interest during 1922.

The ordinary teaching routine of the School of Agriculture was maintained while examinations for the registration of Agricultural Chemists were held in July 1921 at which three candidates presented themselves and all successfully passed.

RODRIGUES.

As the outcome of the report of the Director of Agriculture on his visit to Rodrigues in December 1920, the proposals therein contained for the establishment of a branch of the Department in this Dependency were laid before the Council of Government in January, receiving the sanction thereof and the subsequent approval of the Secretary of State.

His Excellency the Governor paid a special visit to this Dependency in July 1921 accompanied by the Director of Agriculture and subsequently the Government arranged to acquire about 200 acres of land at Oyster Bay for the creation of an Experimental Station and Land Settlement Scheme. At the same time, the Secretary of State was requested to select a suitable candidate for the post of Agricultural Superintendent.

The projected scheme of development comprises the appointment of a trained officer as Agricultural Superintendent, the organisation and laying out of a small experiment station, the inauguration of a definite land settlement scheme combined with Co-operative Credit developments and the fostering of agricultural industries along the usual lines.

During the year, two additional bulls were imported into the island as well as two boar pigs for the improvement of local stock while the development of the Tobacco Industry was undertaken by the introduction of a tobacco buying scheme similar to that introduced in Mauritius.

Previously imported stud animals did useful work during the year while the herd of Cataloniam donkeys introduced in 1920 continued to thrive and a number of young animals were born.

PART II

WORK OF THE DEPARTMENT OF AGRICULTURE DURING THE YEAR 1921.

Staff Changes.

Mr. D. d'Emmerez de Charmoy was appointed Assistant Director of Agriculture in March 1921.

Mr. P. R. Dupont was appointed Additional Assistant Director in August 1921.

Mr. A. S. Clegg arrived in the Colony in May 1921 and assumed duty as Agricultural Superintendent.

Mr. A. R. Toureau returned from leave of absence and resumed duty as Chief Clerk of the Department in March 1921.

In April 1921 he was appointed to act as 2nd Class Clerk in the Colonial Secretary's Office; Mr. J. H. Nicolin, 4th Class Clerk, Immigration Department, was appointed to act as Chief Clerk from that date.

Mr. C. D. D'Avoine resigned his appointment as Acting Assistant Chemist in September 1921.

Mr. F. Giraud was appointed to act as Assistant Chemist from that date.

Mr. S. Gébert resigned his appointment as Scientific Assistant in the Biological Division in August 1921. On the same date Mr. F. Giraud was appointed to act in this post.

From the date of the promotion of Mr. F. Giraud as Assistant Chemist, Mr. W. H. Edwards was appointed to act as Scientific Assistant in the Biological Division in October 1921.

Mr. R. Laval was appointed to act as Scientific Assistant in the Chemical Division in January 1921.

Mr. J. H. Nina, 6th Class Clerk in the Department, was seconded for duty as Assistant Inspector of Co-operative Credit Societies in September 1921.

Mr. W. Bourdet was appointed to replace Mr. Nina as 6th Class Clerk.

Mr. A. Valasois was appointed to act as Chief Overseer of the Department in April 1921. In July 1921 he reverted to his appointment as Overseer Government House Grounds and was succeeded as acting Chief overseer by Mr. F. Leclerc.

Mr. E. Cartier was appointed to act as Overseer in charge Curepipe Gardens in July 1921.

Mr. A. Beeharry was removed from his appointment as Officer in charge Abercrombie Nursery in March 1921, Mr. B. Emmanuel was appointed to succeed him in May 1921.

Mr. J. Toulorge was appointed as Officer in charge The Medine Irrigation Experiment Station in May 1921; in July 1921, he relinquished his appointment and Mr. I. Rivière was appointed to succeed him in November 1921.

Mr. F. Massé was appointed Junior Overseer, Pamplémousses Gardens, in November 1921.

Up to the end of the year no appointment had been made to the vacant post of Botanist and Mycologist.

Taken as a whole, the year must be regarded as one of great Departmental activity. Existing lines of work were maintained and extended and many new lines of activity begun.

During the past 4 years it may be said that the total activities of the Department have easily doubled.

The work of the various Divisions is reviewed in the following pages, in which excerpts from the reports of the various divisional Officers are given.

BIOLOGICAL DIVISION.

The Entomologist reports as follows:—

Phytopathology.—Root diseases of Sugar cane were reported as existing in the Northern districts.

Potato blight (*Phytophthora infestans*) was encountered in severe form on late planted fields of potatoes at various points.

Field investigations respecting the "smut" diseases on Filao (*casuarina equisetifolia*) were continued on the experimental plots at Le Bouchon, Grand River South East in connection with the Forest Department.

A hitherto undescribed disease of Filao was reported attacking filao blanc at Mare aux Vacoas. The Fungus was identified as (*catecium salmonicolar*), an organism which had previously been noted attacking apple and pear trees.

A species of mildew was observed (*Peronospora* Sp:) was observed attacking cultivated *Chenopodium* at Réduit.

Citrus canker (*Pseudomonas Citri*) was observed on Citrus plants at the Central Experiment Station, Réduit.

Lime trees at Belle Rive and Pamplémousses were found to be attacked by a specific bacillus invading the bark and occasioning gumming of the trunk and subsequently the death of the plant.

Insect Pests

Insect pests of minor importance have been as usual reported during the year and dealt with as required.

Campaign against Phytalus Smithi

The campaign against *Phytalus Smithi* was carried out on similar lines as in 1920 but an extension was given to the destruction of beetles in localities not visited by estate gangs and general public. The work of the *Phytalus* campaign is fully reviewed in the report of the Director of Agriculture on the subject published separately.

The parasitic wasp, *Elis thoracica*, imported in 1917 from Madagascar and liberated at Mon Plaisir was observed in great numbers as far as St André and Beau Séjour. Experiments in the insectarium demonstrated that they are parasitic on *Phytalus Smithi*.

Sugar Deterioration

An exhaustive investigation into the causes of deterioration of sugar in Mauritius was carried out during the year. A Bulletin reviewing the question has been prepared for publication.

Soil Biology

A series of investigations have been inaugurated into the Bacterial Flora of the soils of the Colony.

Plant Inspection

44 separate inspections of consignments of plants were made at the Customs and 285 at the Post Office.

Poultry

The Poultry runs of the Department have continued to remain under the supervision of the Biological Division. New birds were received from South Africa.

Educational

Lectures were delivered during the year on Entomological, Biological and Mycological subjects to students of the School of Agriculture and the Laboratory work of the students was regularly supervised.

CHEMICAL DIVISION

The Chemist reports as follows:—

The following samples were analysed during the year under review:—

	<i>Samples</i>	<i>Dosages</i>
Dipping Solutions	115	115
Fumiers and guanos (including mixtures)	35	158
Artificial manures	16	28
Molasses ash	2	22
Water	10	64
Soamin solution... ..	2	4
Oil cake... ..	2	18
Quick lime	2	15
Green fodders	14	70
Cane and cane juices	1,258	2,500
Miscellaneous	8	20
Sugar (one rhizones) — — — —	20	22
Soils — — — —	12	40
Drainage water— — — —	110	110
	<hr/> 1,606	<hr/> 3,186

Physical and chemical analyses were made of samples of soils, and new methods of analysis tried.

The physical and chemical characteristics of the soils of Mauritius are being gradually worked out in conjunction with the biological characteristics.

A considerable number of analyses was made at the top, middle and Rhyzone parts of arrowed and non arrowed sugar canes in connection with studies on the nutrition of canes.

110 analyses of drainage water were undertaken in connection with an investigation into the effects of molasses on nutrification.

The estimation of tannin in various samples of black wath bark was made for the Forests Department, the results showed that the tannin content was poor as compared with the average content of South African barks.

To complete the list of fodders given by Bonâme in the bulletins of the Station Agronomique a series of analyses of fodder plants which are spontaneous in Mauritius or have been introduced recently was started late in the year. Up to the end of the year the 14 samples had been analysed.

A further series of experiments was conducted in connection with alcohol denaturants during the year, and a large quantity of Pyridine for denaturing was purified for the Revenue Department in the Chemical Laboratories.

"Controle Mutuel" Returns.

Fifteen usines contributed to the controle and 4 sets of returns were received, compiled and distributed to the interested parties during the crop.

Educational.

The Director, the Assistant Chemist and the Senior Scientific Assistant delivered altogether 79 lectures to the Students of the School of Agriculture.

VETERINARY DIVISION

Importation of animals

The Government Veterinary Surgeon reports as follows:—

During the year 1921 animals on board 17 steamers and schooners were inspected. The total number of animals introduced into the Colony amounting to 19,647.

The following statement shows the different classes of animals imported:—

Madagascar bullocks ...	17,017	
Pigs	1,416	
Sheep	680	
Cows and Bulls	246	for breeding
Horses	221	
Mules	30	
Donkeys	20	
Dogs	17	
Total ...	<hr/> 19,647	

Inspection of Government animals

Animals of the following Departments were attended during the year for various complaints :

Agricultural Department.—One bull, one cow, two donkeys.

Barkly Asylum.—Two cows, one donkey.

Police Department.—Two mares, three horses.

Medical and Health Department.—One mule, two donkeys.

Immigration Department.—Two donkeys.

Bullocks were also examined for the Medical and Health Department for use in connection with the Sanitary services at Mahebourg.

Stud Animals.—The bulls of the Department of Agriculture have been stationed at La Lucie, Belle Mare, Les Salines, and Labourdonnais. The results were satisfactory.

The Jersey Bull Elsenberg Grand Duke imported from South Africa in 1920 for the Stock Farm died of pneumonia in February 1921.

One half-bred Holstein Bull, one Afrikander Bull and two boar pigs were shipped to Rodrigues for breeding purposes.

Contagious Diseases

Surra.—An acute outbreak of surra occurred in April, May and June. 27 deaths being recorded. Whenever possible, infected animals were slaughtered and rigid quarantine declared.

The outbreak was stamped out by the commencement of July.

Piroplasmosis

An outbreak of Piroplasmosis occurred during the year, 3 affected animals were treated with the Trypan blue and recovered but a number of others died, the drug not being then available on the market. A supply has been ordered from South Africa by Government. The outbreak demonstrates the extreme importance of regular and periodical dipping.

Tetanus

One case of Tetanus was detected on a horse which was immediately slaughtered.

Tuberculosis

Tuberculin tests were carried out, on 147 cows, heifers, and bulls on a number of estates. At one point a 50% infection was detected.

The attention of breeders has been again directed to the need for taking precautions against the disease.

Cases of Cruelty

One case of cruelty was examined at the request of the Police

Meat Inspection

Two Seizures of meat for tuberculois were maintained and the carcasses destroyed; one seizure was not upheld and the carcass given back to the owner.

The slaughtering of 5 farrow heifers and 1 injured cow was allowed under Ordinance 1 of 1918.

Two butchers were prosecuted and fined for slaughtering outside abattoirs.

Experiments were conducted during the year with a view to substituting stamping of meat for branding.

By the end of the year meat stamps had been introduced into one abattoir and steps taken for the inauguration of the practice in other abattoirs throughout the Colony.

STATISTICAL DIVISION

The Statistician reports as follows :

The Blue Book Statistics relative to Agriculture were completed and sent to Government.

Statistical data were supplied, as usual, to the International Institute of Agriculture, Rome, to the Board of Trade, the Colonial Secretary's Office, the Immigration Department etc.

The investigation relative to the cost of manufacture of sugar in factories was continued and is nearing completion.

A Bulletin on the errors of experimental field trials was prepared and an investigation on the correlation of Sugar crops with temperature and rainfall is in course of preparation.

The usual crop forecasts were prepared and submitted for publication while various reports on cyclone effect on plantations, Agricultural intensity of drought, return of cane yields in Black River, monthly reviews of weather and crop etc., were transmitted to Government.

To assist in the work of crop forecasting, the branch meteorological service of the Department has been extended and reorganised, under the general direction of the Statistician. At present at the Central Experiment Station, Réduit, bi-daily observations of temperature of the air and of evaporation, minimum and maximum temperatures, atmospheric pressure and rainfall are made while continuous registration of atmospheric pressure and temperature of the air and of evaporation are secured.

Secondary stations are in existence at the Royal Botanical Gardens, Pamplemousses; the Nursery Gardens, Curepipe; Abercrombie Nursery, Port Louis; Mahebourg Demonstration Plot and the Irrigation Experimental Station, Black River.

These secondary stations send in bi-daily observations of maximum and minimum temperatures, temperature of the air and of evaporation and rainfall.

It is intended to add another Station at Rivière du Poste, Savanne, and to collect yearly results of rainfall observations on various Sugar Estates in Mauritius.

DIVISION OF EXPERIMENTS STATION.

Central Experiment Station

The Agricultural Superintendent reports as follows:—

Experiments with canes.—As in previous years, experiments with varieties of sugar canes have been conducted in different parts of the Colony. Variety experimental plots of plants and ratoons were reaped at Réduit, Pamplemousses, Long Mountain, Highlands, Labourdonnais, Britannia and Beau Vallon.

Manurial experiment plots were reaped at Réduit, Highlands, Britannia, Plaisance and Terracine.

New varietal plots have been established at Long Mountain, Réduit, Highlands and Pamplemousses and a new manurial plot at Réduit. A great number of seedling canes were raised in 1920, of which 900 were planted out in one hole trials, of these, 154 have been selected for further trial, and planted out in 6 hole trials. From these 6 hole trials at Réduit, (1918 sowings) 50 canes have been selected for further trials and are now planted out in the 30 hole trial field at Réduit, whilst of these 6 hole trials of Pamplemousses (1919 sowings), 36 have been selected, and are now planted in 30 hole trials at Réduit, making a total for the year, of 86 new canes in introduced 30 hole trials.

Owing to the poor results of raising seedlings at Réduit, it has been decided to confine the raising of new varieties to Pamplemousses, which place is better suitable for such work.

1,170 seedlings have been raised at Pamplemousses, this year, which have been planted out in 1 hole trials.

1,101 Varietal plots were reaped experimentally, samples of each being crushed in the mill here, the juices being sent to the Chemical Division for analysis. In addition to this, 218 samples of 6 hole trials, and 85 samples of Indian and other canes in the Nursery, were crushed and treated in the same way, making the total of samples crushed 1,404.

Eight of the best Varieties of canes, namely R.P.6, R.P.8, R.P.73, B 6308, B 6450, 33/231, 55/1182 and 108.05, were grown at Pamplemousses expressly for sale to Planters, and of these 600 were sold.

Cuttings of good varieties have also been distributed among planters from the Central Experiment Station.

Reaping was completed on the 14th of December, the canes being sent to Trianon Estate, the total yield at Réduit was 106 tons 300 kilos.

New experiments on the cutting of "Babas" canes and "Trashing" have been commenced at Pamplemousses this year.

Experiments with other Economic Crops

Further experiments with varieties of food crops have been carried out namely:

Maize.—Continuation of breeding by selection trials.

Sweet potatoes.—Trials with 48 varieties.

Manioc " 44 "

Yams " 12 "

Eddoes & Tannias " 8 "

Ground nuts " 12 "

The experiments were duplicated at Pamplemousses. A collection of varieties of ground-nuts was sent to Ceylon, and the surplus stock of yams equalling 600 kilos, and the best varieties of "Eddoes and Tannias" equalling 147 kilos, were distributed among planters.

Quantities of selected maize have been sent to applicants, including a few kilos sent to South Africa.

Varieties of manioc sticks were also sent to South Africa.

A plot of 1/3 acre, was planted in tobacco, which gave good results, the leaves were sent to the Tobacco Factory. A large amount of Tobacco seed has been supplied to planters and 3/4 lb. sent to Rodrigues. Seedling tobacco plants have been, and are being raised, not only for Departmental plantation but to supply orders received from planters.

New experiments with Tobacco, Assolements, and with Fodder crops, have been commenced.

Four pounds of onion seed has been procured from Teneriffe with a view to encouraging the growing of good onions in the Colony. Seed has been sown at Réduit, Pamplemousses and Curepipe; plants and seed will be distributed among applicants, and trial plots of onions will be established at each place.

All produce of the experiments, not distributed among planters was given to the cattle of the Stock Farm.

Stock Farm.—The Stock Farm has made excellent progress.

The following births have been recorded:—

1 pure bred Hissar Bull calves.	1 3/4 bred Holstein Bull calf.
3 " " heifer calves.	1 3/4 " heifer calf.
2 " Holstein Friesland Bull calves.	2 pure bred Mysore Bull calves.

The $\frac{1}{2}$ bred Holstein calf "Tugela I" was found to be farrow and sold to the butcher, and the pure bred Jersey Bull "Elsenberg Grand Duke" died on the 1st February.

The following bulls stood for services at the following estates :—

Ongole Bull, Hathi I	—	La Lucie, April–May.	Belle Mare, July–September.
Ongole Bull, Hathi II	...	Belle Mare, April–May.	La Lucie, July–September.
Mysore Bull, Mysam II	...	Les Salines, July–September.	
Friesland Bull, Elsenberg Beau Brommel	—	Labourdonnais, August–October.	

The following services were recorded at the Stock Farm :—

Holstein Friesland Bull, Riveinhill Chieftain.	...	26
" " Réduit Chieftain I	...	23
Jersey Bull, Elsenberg Grand Duke	...	3
Ongole Bull, Hathi I	...	8
" " Hathi II	...	11
Hissar Bull, Amir I	...	2
" " Amir II	...	1
Mysore Bull, Maharajah I	...	1
Friesland Bull, Elsenberg Beau Brommel	...	27

Total number of services : 102

The cattle are all in good condition and free from disease.

No sale of stock was held during the year, and consequently the stables are full, and the erection of a new stable in the near future is necessary.

During the year, concrete posts were erected in place of the wooden ones at the paddock entrance so that the paddock now looks neater and is more serviceable. A machine for white washing was introduced, this proving very useful and a great saving of labour.

Buildings and Roads.—Roads around the experiment station have been improved, and also the labourers' camp. An incinerator was erected and the Overseer's quarters were painted outside, during the year.

Royal Botanical Gardens, Pamplémousses.

Economic Section.—Attention was given during the year to the usual experiments with canes. One plot planted with selected varieties, especially intended for sale to planters was reaped between October–December and over 500 canes were taken up by estates situated in almost every district of the Colony. Experiments with maize, yams, pistache, beans, sweet potatoes and manioc were continued.

The crop of tobacco yielded about 9,000 kilos of green leaves. These were sent to the Tobacco Factory after drying in the Sècherie.

The lime and areca plantations were maintained in good condition. Some of the areca palms have borne seeds for the first time, during the year.

Ornamental Section.—The work of improvement was continued in various sections of the grounds, the remetalling of the roads at the centre of the gardens was completed. Several plots of land were grassed over and a new horse-drawn mower was purchased to assist in the cutting of the grass.

One new kiosk was built on an islet in the Grand Bassin, and others rethatched. Several new bridges were erected to give easy access to the islets in this Bassin.

The railing at the main entrance was painted and the general aspect of the gardens satisfactorily maintained at all times of the year.

The work of preparing herbarium specimens for identification of unknown plants was continued. Identifications were received of some 50 herbarium specimens sent to the Royal Botanical Gardens Kew, during the past two years, the identity of which had been lost.

A large number of seeds, cuttings and plants were supplied to Public Institutions, to members of the public and foreign correspondents.

Planting material of various varieties of plants were received from India, Egypt, Seychelles, New Zealand, Australia, Singapore, and West Indies and locally from Mr. Gabriel Regnard.

10,053 persons visited the Gardens during the year and 352 pic-nics were held in the grounds.

Curepipe Gardens

Economic Section.—The Economic Sections were maintained in good order ; experimental plantations of rice failed owing to bad season.

Ornamental Section.—The ornamental section, flower beds and roseries were improved. Some new ornamental plants were introduced into the fernries, grass lawns and borders were maintained in good order and ledges regularly trimmed.

Educational Section.—The educational section and Model School Garden was maintained in good condition and periodical lessons given therein to pupils of the Royal College.

The nursery work was extended and 452 roses together with a large quantity of cuttings of plants of other ornamentals sold to the public.

Plants were supplied for planting up in the grounds of the Victoria Hospital and the Mauritius Institute.

Buildings were maintained in good order.

By direction of the Governor the Agricultural Department undertook the planting of Bougainvillea hedges and palms on either side of the new roads at Floreal. By the end of

the year the palms were practically all established and were protected by wooden guards while the bougainvillea hedges were in most places growing well.

Abercrombie Nursery

The work of this Nursery underwent considerable extension during the year; the citrus plants planted for propagating purposes made good progress, as did also Mangoes and Litchis.

It was possible during the year to produce a considerable number of budded citrus plants comprising oranges, naartjes and lemons.

Some difficulty was encountered in connection with the water supply and the installation of two new taps and the enlarging of the basins got over the difficulty.

The drainage of the plot has improved. Difficulties were encountered owing to scarcity of labour.

The following is a list of plants supplied from the Nursery during the year:—

Litchi layers	...	...	193
Budded oranges	...	...	35
Grafted mangoes	...	...	104
Lime plants	...	...	1,450
Oreoxora regia	...	...	38
Cloves	...	...	43
Seedling mangoes	...	...	56
Bassia latifolia	...	...	12
Jujube	...	...	3
Tobacco seedlings	...	...	89,800
Miscellaneous economic trees	...	...	2,140

93,874

The revenue derived from plant sales amounted to Rs. 1,548.83. The progress made is satisfactory and there is every reason to hope that the undertaking will again show a considerable advance next year.

Grounds of Victoria Hospital

The laying out of the grounds of the Victoria Hospital was entrusted to the Agricultural Department during the year. A plan of the work was prepared by the Agricultural Superintendent and work was begun there in September. By the end of the year, a considerable area had been laid down in lawns, concrete edgings made to certain of the roads, the making of flower beds taken in hand and the planting of ornamental plants began. The supervision of the work was under the general control of the Assistant Director.

Le Réduit Grounds

The various sections of the grounds were maintained in good condition, a considerable area of forest land was cleared and made ready for replanting in forest trees.

At the Bout du Monde section an ornamental Temple has been built on an island in a small lake. The adjoining land has been laid out in flower beds and ornamental shrubs.

Flower Gardens.—The flower beds, Green Houses and Fernery were maintained in satisfactory condition. A large collection of Begonia rex was added to the Green House plants and some improved varieties of "Cactus" dahlias were planted.

His Excellency the Governor also introduced from Ceylon a certain number of Canna Rhizomes and ornamental trees and shrubs of various description, these have been laid out at different spots and are thriving well.

Vegetables and fruits have been uninterruptedly supplied from the kitchen gardens.

Rainfall

The Rainfall at the Experiment Stations and Gardens was as follows:

Royal Botanical Gardens, Pamplemousses	...	...	1301.7 millim.
Royal Central Experiment Station and Government House Grounds	...	...	1502.9 "
Curepipe	...	...	2664.2 "

DIVISION OF AGRICULTURAL INSTRUCTION

Food plantations and Commercial undertakings.

The Agricultural Instructor reports as follows:—

Co-operative Credit Societies.—231 visits were paid to Co-operative Credit Societies during the year, a mean of 7.2 per society. 4 new societies were inaugurated and there are prospects of others being formed in the near future. The work of these societies is reviewed in the annual report of the Registrar published separately.

Demonstration Plots.—The four demonstration plots at Montagne Longue, La Ferme, St. Martin and Mahebourg were maintained in good order during the year.

School Gardens.—Considerably increased attention was devoted to School Gardens. Fresh regulations were drafted for the management of the School Gardens by the Director of Agriculture in consultation with the Superintendent of Schools and arrangements for the registration of School Gardens were made.

Arrangements were made for regular visits of inspection to be paid by the Overseer of Food Plantations to School Gardens during the year and the preparation of a pamphlet containing hints on the management of School Gardens was undertaken by the Department.

The work in this connection remains under the general supervision of the Agricultural Instructor.

Food Settlements.—The Food Settlements at La Ferme and St. Martin have made considerable progress during the year. Thirty-five additional acres of land were placed at the disposal of this Department for growing food crops on Crown Land St. Thomas.

The effect of the establishment of Co-Operative Credit Societies at these two points has been very beneficial in improving the food settlements and has provided capital for the small settlers at these two points. Fifty-seven visits were paid to these settlements by the Agricultural Instructor during the year.

At La Ferme approximately 95 acres are under cultivation, at St. Martin 30 acres, and at St. Thomas 18 acres.

Owing to unfavourable weather the yields at La Ferme and St. Martin were smaller than in previous years.

The principal crop grown is maize with some patate and manioc; a certain area also being cultivated in the local variety of tomatoes known as "Pommes d'Amour."

At the end of the year a maize sheller was introduced for shelling maize grown by settlers.

Of the other blocks of Crown Lands which were allocated for food cultivation in 1917, those at Joachim, Mon Boudoir, Montagne Blanche have been handed back to the Forest Department for afforestation, and at Powder Mills for purposes of the proposed Leper Hospital.

At Sébastopol and La Nicolière the plantations have been fairly well-maintained.

The need for these food settlements is less pressing than formerly owing to the increase in the area being planted up with vegetables and food crops by small planters since the fall on the price of sugar.

Maize Sècherie.—The Maize Sècherie operated during the months of April-December.

Maize was purchased at Mahebourg and Black River on Government account treated at the Sècherie and stored for resale.

The following statement is the summary of operations during the year,

Locality purchased or from which obtained	Cob Corn	Shelling	Equivalent weight shelled maize	Shelled Maize purchased	Total weight	Mean M. C.	Lost in weight
	Kilos	%	Kilos	Kilos	Kilos		
Black River ... ..	...	...	...	67,362	67,362	24 ⁰	12 ⁰ ...
La Ferme ... ..	...	...	...	4,156	4,156	25 ²	13 ⁶ ...
Pamplemousses ... ..	...	...	...	5,640	5,640	27 ⁰	15 ⁴ ...
Mahebourg ... ..	...	...	...	72,384	72,384	25 ²	12 ⁶ ...
Reduit, C. E.S.,	6,024	65	3,915	...	3,915	25 ⁰	13 ⁰ ...
Manager Tobacco Factory	1,023	65	664	...	664	27 ⁰	16 ⁰ ...
Barkly Asylum ... ..	...	...	6,300	...	6,300	24 ⁵	12 ⁷ ...
St. Hubert Estate	5,856	65	3,804	...	3,804	26	13 ⁰ ...
Total	12,903	...	14,683	159,542	164,225	...	...

The total amount of shelled maize handled during the year exceeds that treated during the preceding year by 58,701 kilos.

The net cost of kilndrying maize worked out at Rs. 27.13 per ton.

The new engine installed during the previous year worked very satisfactorily, while the increased storage accommodation enabled a larger amount of grain to be treated.

The grinding machine was operated during the year and 2,500 kilos of maize was ground into grits.

During the period the Sècherie was not operating, the services of the Manager were utilised in supervising the laying out and reaping of cane experiments, in collecting agricultural information and visiting small Planters.

Tobacco Factory.—The operations of the Tobacco Factory were considerably extended during the year. 23,065 kilos of green tobacco were received by the Factory and placed in the Sècheries, the tobacco being derived from Government plantations and from various growers. This tobacco yielded 3,220 kilos of dried tobacco leaves.

16,525 kilos of dried tobacco leaves were received from growers and from Government, of this, 10,144 kilos came from Rodrigues.

The total value of raw tobacco handled is estimated to be Rs. 16,848.

Up to the end of the year 11,019 carottes had been made representing 6,995 kilos of dried tobacco.

813 carottes were manufactured during the year, the net weight being 3,075 kilos. The percentage of tobacco obtained was 38%, the low extraction being due to the fact that some of the carottes were somewhat overcured.

Tobacco sales realised a sum of Rs. 8,306.54cs. As working expenses Rs. 2,588.77.

On the 31st of December there were in stock 1,059 carottes, 10,403 kilos of dried tobacco and 99 kilos of cut tobacco.

The tobacco met with a ready sale throughout the year and the demand exceeded the supply.

Proposals were approved for the installation of a new cutting machine and an electric motor for driving it in view of the increased quantity of tobacco which will have to be handled by the end of 1922.

Sisal Plantation, Plaine Lauzun.—The Sisal Plantation at Plaine Lauzun was maintained in good order during the year and by the end of the year, by His Excellency's directions, steps had been taken for the extension of the plantation by the addition of another 30-40 acres on the western side of the Railway.

Trials were made with the planting of intercalary crops of maize between young sisal; owing to unfavourable weather the plantation did not do as well as might otherwise be expected but served to demonstrate that on lands practically free from stones the cost of cultivation can be materially reduced by this means.

Lime Plantation, Belle Rive.—This experimental plantation made moderate progress during the year, but trouble was experienced owing to the prevalence of a gumming disease which attacks the plants at their collars and a number of plants had to be replaced.

It was found that when the disease had not attained too great a hold, treatment of the soil with lime produced some improvement.

Tobacco plantations by private individuals.—During the year 24 acres of Crown Lands at Plaine Lauzun and St. Thomas were leased to small cultivators for the growing of tobacco without payment of tax.

At Plaine Lauzun, the plantations were only moderately successful, the soil being too heavy for the successful growth of tobacco; owing to this and to difficulties with the Sanitary Authorities, the plantations were discontinued during the year.

Better results were obtained at St. Thomas.

In July a scheme was approved whereby growers were exempted from payment of tax on lands cultivated in tobacco, on their signing an agreement to sell their tobacco to Government.

By the end of the year 67 growers representing a total area of 53½ acres had entered into the required agreements.

The majority of the plots in respect of which these agreements had been made were inspected by the Agricultural Instructor and the Manager Tobacco Factory during the year.

Arrangements were made in conjunction with the Division of the Experimental Stations for the supply of tobacco seed and plants to growers under the scheme.

SCHOOL OF AGRICULTURE.

Five students were admitted to the School of Agriculture in August 1921 after a competitive examination.

Examinations for 1st, 2nd and 3rd year students were held in June. Mr. R. Avice du Buisson and R. Lincoln successfully completed the course of training, passed the final examination and were awarded the Diplomas of the Department.

The following courses of lectures were delivered by various Departmental Officers during the year:—

Agricultural Chemistry	...	...	...	50	lectures
Sugar House Chemical Control	...	...	...	9	"
Sugar Technology	...	...	...	17	"
Biology and Entomology	...	...	...	37	"
Botany	...	...	...	28	"

Total ... 141 "

Lecturers were: the Director, the Assistant Director, the Assistant Chemist, the Scientific Assistant and the Agricultural Superintendent.

The Laboratory work of the Students was systematically supervised and their note-books periodically inspected.

Four visits were arranged for Senior students to Sugar Estates; three 2nd and 3rd year students worked in the Laboratories of Sugar Factories during the crop.

The accommodation was enlarged by some modification of the existing arrangements.

In connection with the work of the School, a course of 20 lectures was also delivered by the Agricultural Superintendent on Elementary Nature Study adapted to the requirements of teachers in Elementary Schools.

With the development of the proposals for the enlargement of the School of Agriculture to form a small Agricultural College the work will receive an expansion which is the definite development of efforts which have been in progress for many years past.

Irrigation Experiment Station.

Following discussion on the subject, of the yields of canes under irrigated conditions in Mauritius, steps were taken to lay out an Experiment Station for the studying of problems connected with the irrigation of Sugar canes at Médine.

The sum of Rs. 30,000 was voted by the Council of Government for the establishment of the station and arrangements were made whereby 30 acres of land in Black River were placed at the disposal of Government, free of rent, for the period of 5 years by the Médine Sugar Estate Company.

The work of laying out the Station was commenced in May and by the end of the year was practically completed. The Station comprises a storage reservoir of a capacity of 22,500 cubic feet, a main distributary canal and secondary canals in concrete with laterals constructed in red earth, lime and molasses mixture.

The experimental fields were surveyed before the commencement of the experiments and laid out in contours along which the stones in the fields were piled in rows. The furrows in the field also follow the contours, the laterals running across them at intervals of 50 feet thereby facilitating economy of water in application.

The equipment further comprises a series of V. notches to enable the amounts of water applied to any one section being accurately measured.

Owing to drought in the early months of the year it was not found possible to commence planting before December when the 1st and 2nd fields were laid down.

The programme of the experiments to be carried out comprises tests as to the frequency and depth of watering, the effect of cultivation following watering, the effect of application of molasses and manures on irrigated lands and the trying out of varieties, while at the same time if will be possible to test how far the economy of water is capable of being effected by rational methods of application.

Experimental Dairy

The need for some improvement in the milk supply of the Colony having become increasingly evident, it was decided during the year to inaugurate an Experimental Dairy for the supply of milk to Government Institutions.

The sum of Rs. 100,000 from the Development Fund being appropriated for the purpose.

The site selected for the experiment was on Crown Land in the vicinity of Curepipe but as some doubt exists as to the suitability of this area, the attempt is only being made in a tentative manner for the present.

In September-October 1920, temporary stables, with offices and store-rooms were erected for 25 cows at this point and the necessary utensils and apparatus procured for the Dairy. At the same time, 25 Highgrade Friesland cows were ordered from South Africa through the courtesy of the Department of Agriculture at the Union.

It is intended that the milk yielded from the Dairy should be supplied to the Civil Hospital in Port Louis and if the experiment proves successful it is intended to extend at a later date.

BOARD OF AGRICULTURE.

The Board of Agriculture established under Ordinance No. 30 of 1912 consists of:—

His Excellency the Governor—President,

The Honourable The Director of Agriculture, Vice-President.

The following members were appointed under Government Notification No. 74 of 5th March, 1921.

The Hon. Sir Henry Leclézio, K.C.M.G.,

„ M. Martin

„ J. A. Duclos, C.M.G.,

„ G. Antelme

E. Carcenac, Esq.,

M. Lagesse, Esq.,

Th. L. d'Arifat, Esq.,

L. H. de Froberville, Esq.,

H. G. Ducray, Esq.,

W. P. Ebbels, Esq.,

Marcel d'Unienville, Esq.,

A. Hugnin, Esq.,

T. W. Innes, Esq.,

F. N. Langlois, Esq.,

E. Rouillard, Esq.,

G. Regnard, Esq.,

A. Wiéhé Esq.,

H. Bhunnoo, Esq.,

Upon the resignation of Mr. W. P. Ebbels, His Excellency the Governor has been pleased to appoint Mr. J. J. Gibson as member of the Board (Government Notification No. 296 of 29th October, 1921.)

In 1921, one meeting of the Board of Agriculture was held on July 20th, 1921.

At the meeting, presided over by His Excellency the Governor, the following printed reports and bulletins were laid before the Board:—

Bulletin No. 21—Composition and Utilisation of Exhausted Molasses.

„ No. 22—Hints on management of Dipping Tanks.

Leaflet No. 15—Hints on precautions against Surra.

Memo re: Factory figures 1920-21 Crop.

Preliminary Estimate of Crop 1921-22.

Selection of Motor Tractors for importation.

Notice re: Increased cultivation of Tobacco.

Governor's minute re: Extension of the School of Agriculture.

Experiment Station for Irrigation of Sugar Canes.

The following matters received consideration:—

- (1) Presentation of the Diploma of the School of Agriculture to Messrs. R. Lincoln and R. Avice du Buisson and of the certificate for the registration as Agricultural Chemists to Messrs. R. Lincoln and Ph. Orian.
- (2) Introduction of Motor Implements.
- (3) Experiments with new cane varieties.
- (4) The Government Dairy.

PUBLICATIONS.

The following publications were issued during the year :—

Bulletin Series

- Composition and Utilisation of Exhausted Molasses.
- Hints on matters connected with the management of Dipping Tanks.
- Experiments with varieties of Sugar Canes.

Leaflet Series

- Hints on precautions against Surra.

The following memoranda and reports were prepared and submitted to the Council of Government and the Board of Agriculture :—

- Report on Co-Operative Credit Societies.
- Report on operations against *Phytalus Smithi*.
- Memorandum respecting Agricultural Tractors in Mauritius from the English Ministry of Agriculture.
- „ Factory figures of crop 1921-22

Conditions respecting cultivation of tobacco without payment of tax.

LEGISLATION.

The following Ordinances, Proclamations and Regulations to Agriculture were issued during the year :—

- Ordinance No. 4 of 1921, to amend Ordinance No. 2 of 1894 re : Botanical Gardens.
- Proclamation No. 4 of 10.1.21, to remit stamp duties etc., for the New Grove Co-Operative Credit Society.
- „ No. 8 of 29.1.21 to remit stamp duties etc., for the Piton and Poudre d'Or and Vieux Grand Port Co-Operative Credit Societies.
- „ No. 24 of 12.5.21 to remit stamp duties etc., for the Stanley Co-Operative Credit Society.
- „ No. 55 of 30.11.21 to remit stamp duties etc., for the Rose Hill Corps de Garde Co-Operative Credit Society.
- „ No. 40 of 11.8.21 : To proclaim the area of the District of Pamplémousses infected with *Phytalus Smithi*.
- Government Notification No. 178 re : Agricultural Forestry Apprenticeships.
- „ „ No. 219 : To preserve property and secure order in Botanical Gardens.
- „ „ No. 359 : Regulations in connection with School Gardens.

EXPENDITURE AND RECEIPTS

The expenditure of the Department has been as follows :—

	Rs. c.
Personal Emoluments	90,722.65
Maintenance of Gardens	18,144.37
General Services	1,693.16
Prevention of Plant pests and Diseases	1,436.12
Prevention of animal Diseases	1,749.59
Upkeep of Stock	9,274.38
Establishment of Demonstration Plots... ..	2,196.76
Subvention to Société Horticole	1,000.00
Travelling Expenses	9,865.18
Miscellaneous Expenses, C.C.S.	7.00
Maintenance of Food Plantations	2,507.29
Maintenance of Experiment Stations	13,980.32
Minor Industries	23,131.50
Apparatus and Chemicals etc.	7,713.81
Nursery for Economic Plants	1,721.04
Registration of Chemists' Examination	60.60
Destruction of <i>Phytalus Smithi</i>	51,641.44
Additional Typewriter	997.98
One sugar Polarimeter	1,500.00
Accommodation Maize Sècherie	1,000.00
Importation of stock	3,776.76
Importation of Soamin	1,865.86
One weighing Machine	928.41
Installation of Experimental Dairy	12,195.98
Medine Experiment Irrigation Station	37,051.47
Purchase of raw tobacco for manufacture	6,286.97
Purchase of maize for kiln drying	26,854.58
Planting of trees at Floreal	1,180.94
Loans to Co-operative Credit Societies	8,600.00
Total ...	343,084.16

The receipts were :—

	Rs.	c.
Sale of Flowers and plants	3,726.78	
Services of animals	502.00	
Sale of eggs and Poultry	642.06	
Sale of canes	11,929.28	
Analytical Fees	447.00	
Students' Fees	252.50	
Miscellaneous	2,063.37	
Rent of Tea Plantation	1,100.00	
Sale of Tobacco	5,779.89	
Sale of Maize	10,824.24	
Contribution C.C.S	735.00	
Veterinary Fees, (Customs)	1,329.00	
Destruction of <i>Phytalus Smithi</i>	45,844.93	
Loans repaid	4,405.00	
Interest of Loans		
Rent of Crown Lands at La Ferme and St. Martin	328.00	
Total	89,909.05	

January 12th, 1922.

H. A. TEMPANY,

Director of Agriculture.

